

**EPA Superfund
Record of Decision:**

**HRANICA LANDFILL
EPA ID: PAD980508618
OU 01
BUFFALO TOWNSHIP, PA
06/29/1990**

Text:

00 PM ON JUNE 7, 1990, AT THE BUFFALO TOWNSHIP MUNICIPAL BUILDING. AT THIS MEETING, REPRESENTATIVES FROM EPA AND PADER ANSWERED QUESTIONS ABOUT THE HRANICA LANDFILL SITE AND THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION. NO WRITTEN COMMENTS WERE RECEIVED DURING THE PUBLIC COMMENT PERIOD. THE RESPONSIVENESS SUMMARY (PAGE 35) IS BASED ON ORAL COMMENTS RECEIVED DURING THE PUBLIC MEETING. THE ABOVE ACTIONS SATISFY THE REQUIREMENTS OF SECTION 113(K) AND 117 OF CERCLA, 42 USC SECTIONS 9613(K) AND 9617.

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D. SCOPE AND ROLE OF OPERABLE UNITS

THE HRANICA LANDFILL SITE HAS BEEN DIVIDED INTO TWO OPERABLE UNITS.

1. OPERABLE UNIT 1

OPERABLE UNIT 1 (OU1) CONSISTS OF THE SOILS LOCATED IN THE ASH PILE AREA AND OTHER AREAS OF THE SITE WHERE THE CONCENTRATION OF LEAD IN THE SURFACE SOILS EXCEEDS 300 PARTS PER MILLION (PPM). THE SITE-SPECIFIC BACKGROUND LEAD LEVEL RANGE IS FROM 9-299 PPM. OU1 CONSISTS OF THE SOILS WHERE THE LEAD CONCENTRATION IS ABOVE THE BACKGROUND RANGE.

THE SOIL AREAS, DEFINED BY OPERABLE UNIT 1, POSE A THREAT TO HUMAN HEALTH AND THE ENVIRONMENT BECAUSE OF THE RISKS ASSOCIATED WITH DERMAL CONTACT OR INGESTION OF THESE SOILS. THE PURPOSE OF THE RESPONSE AUTHORIZED BY THIS ROD IS TO PREVENT INCIDENTAL DERMAL CONTACT WITH OR INGESTION OF CONTAMINATED SOILS.

2. OPERABLE UNIT 2

OPERABLE UNIT 2 (OU2) CONSISTS OF THE ONSITE AND OFFSITE GROUNDWATER. A GROUNDWATER VERIFICATION STUDY WILL BE CONDUCTED TO DETERMINE IF ANY REMEDIATION OF THIS OPERABLE UNIT IS REQUIRED. A SUBSEQUENT ROD WILL BE WRITTEN THAT WILL ADDRESS ANY FURTHER REMEDIATION THAT MAY BE REQUIRED AT THIS SITE.

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E. SITE CHARACTERISTICS

THE 1990 POPULATION FOR BUFFALO TOWNSHIP IS ESTIMATED TO BE 6,600. THE TOWNSHIP OCCUPIES 23.9 SQUARE MILES, OF WHICH 25 PERCENT IS UNDER AGRICULTURAL USE. CORN FIELDS BORDER THE SITE TO THE NORTH, WEST, AND EAST, AND ORCHARDS BORDER THE SITE TO THE SOUTH. THE SITE SITS AT THE END OF AN EAST-TO-NORTHEAST-TRENDING RAVINE. A SMALL UNNAMED TRIBUTARY OF LITTLE BULL CREEK DISCHARGES INTERMITTENTLY ONSITE THROUGH THIS RAVINE. THE FLOW THROUGH THE RAVINE ORIGINATES FROM SURFACE RUNOFF AND INFILTRATION/SEEPS FROM THE SITE. A SUB-BASIN DRAINAGE DIVIDE IS MARKED BY A FLAT HILLTOP WHICH ENCIRCLES THE RAVINE EXCEPT ON THE NORTHEAST. TO THE WEST OF THE SITE, AN UNNAMED TRIBUTARY OF MCDOWELL RUN FLOWS SOUTH THROUGH A NARROW, STEEP VALLEY. THERE ARE NO ENVIRONMENTALLY SENSITIVE AREAS, SUCH AS WETLANDS OR PARKS, IN THE IMMEDIATE VICINITY OF THE SITE. SIMILARLY, THERE ARE NO ENDANGERED SPECIES OR CRITICAL HABITATS LOCATED NEAR THIS SITE.

GROUNDWATER FLOWS THROUGH THE SITE THROUGH THREE AQUIFERS CONTAINED IN THREE DIFFERENT GEOLOGICAL UNITS; (1) THE SHALLOW MORGANTOWN SANDSTONE AQUIFER IS 15 TO 60 FEET THICK THROUGHOUT THE SITE. THE SHALLOW AQUIFER APPEARS TO BE A PERCHED SYSTEM WITH LIMITED RECHARGE AND STORAGE CAPACITY. THE AQUIFER DISCHARGES THROUGH SEEPS AND SPRINGS, AND BECAUSE OF ITS LOW PRODUCTIVITY, IT IS UNLIKELY TO EVER BE USED AS A RESIDENTIAL WATER SUPPLY. (2) THE BIRMINGHAM SHALE/PITTSBURGH RED BEDS LAYER IS A SEMI-CONFINED, WATER-BEARING UNIT AT A DEPTH OF 70 FEET, WHICH FLOWS TO THE EAST TOWARD LITTLE BULL CREEK, BULL CREEK, AND THE ALLEGHENY RIVER. THIS AQUIFER IS ALSO CONSIDERED UNPRODUCTIVE, AND THEREFORE IS NOT

LIKELY AS A WATER SUPPLY SOURCE. (3) THE SALTSBURG/BUFFALO SANDSTONE IS AN APPARENTLY CONFINED AQUIFER AT A DEPTH OF 180 FEET. THE AQUIFER FLOWS TO THE SOUTHEAST, DISCHARGING TO THE ALLEGHENY RIVER, AND PROVIDES GROUNDWATER TO OFFSITE RESIDENTIAL WELLS THAT ARE NOT SERVED BY LOCAL WATER AUTHORITIES. ALTHOUGH THIS LOWER AQUIFER HAS NOT BEEN CLASSIFIED, IT APPEARS TO HAVE CLASS II CHARACTERISTICS, WHICH MEANS THAT IT COULD POTENTIALLY BE USED AS A WATER SUPPLY.

#NEC

F. NATURE AND EXTENT OF CONTAMINATION

PREVIOUS REMOVAL ACTIVITIES AT THE HRANICA LANDFILL SITE RESULTED IN THE REMOVAL OF 19,000 DRUMS AND 4,000 CUBIC YARDS OF CONTAMINATED SOILS. THESE ACTIONS REDUCED THE EXTENT OF CONTAMINATION, HOWEVER, FURTHER STUDIES REVEALED THAT ELEVATED LEVELS OF ORGANIC AND INORGANIC CONTAMINANTS ARE STILL PRESENT ON THE SITE. THE PRIMARY CONTAMINANTS OF CONCERN INCLUDE; LEAD, CHROMIUM, CADMIUM, AND POLYCHLORINATED BIPHENYLS (PCBS). THE SOURCE(S) OF CONTAMINATION HAVE BEEN IDENTIFIED AS THE ASH PIT, LANDFILL, AND DRUM STORAGE AREA (FIGURE 2). THE VOLUME OF CONTAMINATED SOIL HAS BEEN ESTIMATED TO BE 219,000 CUBIC FEET (8,100 CUBIC YARDS).

GROUNDWATER ANALYSES REVEALED VOLATILE ORGANIC COMPOUNDS AT ELEVATED LEVELS IN THE SHALLOW, PERCHED AQUIFER BELOW THE ASH PIT AREA (MW-3S). THE COMPOUNDS INCLUDED TOLUENE, ETHYLBENZENE, TOTAL XYLENES, AND 4-METHYL-2-PENTANONE. HOWEVER, THIS WATER SYSTEM IS NOT USED AS A WATER SUPPLY SOURCE. ONSITE WELLS IN THE DEEPER AQUIFERS INDICATE MINIMAL CONTAMINATION. NONE OF THE GROUNDWATER SAMPLES TAKEN FROM DOMESTIC WELLS EXHIBITED ELEVATED LEVELS OF SITE-RELATED COMPOUNDS. IN ADDITION, THERE IS MINIMAL DEGRADATION OF THE SURFACE WATER QUALITY IN THE SITE AREA. BASED ON AVAILABLE INFORMATION, IT IS BELIEVED THAT OFFSITE CONTAMINANT MIGRATION IN THE DEEP AND INTERMEDIATE AQUIFER HAS NOT OCCURRED TO ANY SIGNIFICANT EXTENT.

THE GROUNDWATER VERIFICATION STUDY, WHICH WILL BE DONE AS PART OF THE REMEDIAL DESIGN FOR OPERABLE UNIT 1, WILL ALSO ADD TO, AND MAY CONFIRM, THE INFORMATION ALREADY ACCUMULATED DURING THE RI/FS ABOUT THE GROUND AND SURFACE WATER CONTAMINATION IN AND AROUND THE SITE.

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II. SUMMARY OF SITE RISKS

A. POTENTIAL CONTAMINANTS OF CONCERN

GROUNDWATER, SURFACE WATER, SOIL GAS, SURFACE SOIL, AND SEDIMENTS WERE IDENTIFIED AS THE MEDIA AT THE SITE TO WHICH HUMAN POPULATIONS MAY BE EXPOSED. EACH OF THESE MEDIA WERE ANALYZED FOR VARIOUS ORGANIC AND INORGANIC CONSTITUENTS. THE RESULTS OF THESE ANALYSES WERE EVALUATED WITH RESPECT TO TOXICITY, MEASURED CONCENTRATIONS, FREQUENCY OF DETECTION, AND POTENTIAL HUMAN EXPOSURE TO DETERMINE THE POTENTIAL CONTAMINANTS OF CONCERN (PCOCS) FOR EACH MEDIA. THE FOLLOWING PCOCS WERE IDENTIFIED FOR EACH MEDIA;

GROUNDWATER

ORGANICS	INORGANICS
BENZENE	CADMIUM
4-METHYL-2-PENTANONE	CHROMIUM
2-BUTANONE	LEAD
ACETONE	BERYLLIUM
NAPHTHALENE	NICKEL

SOIL

ORGANICS	INORGANICS
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TOLUENE
XYLENES (TOTAL)
TETRACHLOROETHYLENE
TRICHLOROETHYLENE
1,1,1-TRICHLOROETHANE
NAPHTHALENE
BIS(2-ETHYLHEXYL)PHTHALATE
POLYCHLORINATED BIPHENYLS

ANTIMONY
ARSENIC
BARIUM
CADMIUM
CHROMIUM
LEAD
MANGANESE
MERCURY
NICKEL
SELENIUM
ZINC
CYANIDE

SOIL GAS

ORGANICS
BENZENE
TOLUENE
XYLENES (TOTAL)

HUMAN EXPOSURE TO SURFACE WATER AND SEDIMENTS IS NOT ANTICIPATED, THEREFORE, NO PCOCS WERE IDENTIFIED FOR THESE MEDIA. THE RISK ASSESSMENT DID NOT TAKE THE SHALLOW OR INTERMEDIATE AQUIFERS INTO CONSIDERATION BECAUSE NEITHER AQUIFER SERVES AS A DRINKING WATER SUPPLY, AND FUTURE USE OF THE AQUIFERS IS CONSIDERED UNLIKELY BECAUSE OF THEIR LOW PRODUCTIVITY. THE CONCENTRATIONS OF THE PCOCS USED FOR THE RISK ASSESSMENT ARE PRESENTED IN TABLE 1. THE FIGURES ARE FROM THE ENDANGERMENT ASSESSMENT WHICH WAS PRODUCED BY IT UNDER A CONTRACT FROM PPG.

B. EXPOSURE ASSESSMENT

THE HRANICA LANDFILL SITE WAS EVALUATED WITH RESPECT TO PHYSICAL CHARACTERISTICS, CURRENT AND FUTURE LAND USE, AND EXPOSED POPULATIONS TO IDENTIFY POTENTIAL EXPOSURE PATHWAYS. THE FOLLOWING EXPOSURE PATHWAYS WERE IDENTIFIED;

GROUNDWATER PATHWAY

- * WATER INGESTION
- * INHALATION OF VOLATILIZED CONSTITUENTS
- * DERMAL CONTACT

SOIL PATHWAY

- * SOIL INGESTION
- * SOIL INHALATION
- * DERMAL CONTACT

SOIL GAS PATHWAY

- * INHALATION

POTENTIALLY EXPOSED POPULATIONS WERE IDENTIFIED AND EVALUATED TO ESTIMATE DAILY INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA FOR BOTH ONSITE AND OFFSITE RECEPTORS. THE POPULATIONS IDENTIFIED INCLUDE; (1) AN OFFSITE CHILD HAVING AN AVERAGE BODY WEIGHT OF 34 KILOGRAMS (KG) AND AN EXPOSURE DURATION OF 18 YEARS; (2) AN OFFSITE ADULT HAVING AN AVERAGE BODY WEIGHT OF 70 KG AND AN EXPOSURE DURATION OF 30 YEARS; (3) AN ONSITE CHILD HAVING AN AVERAGE BODY WEIGHT OF 34 KG AND AN EXPOSURE DURATION OF 6 YEARS; AND (4) AN ONSITE ADULT HAVING AN AVERAGE BODY WEIGHT OF 70 KG AND AN EXPOSURE DURATION OF 70 YEARS.

C. TOXICITY ASSESSMENT

THE RELATIONSHIP BETWEEN THE EXTENT OF EXPOSURE TO A CONTAMINANT AND THE POTENTIAL FOR ADVERSE EFFECTS WAS EVALUATED DURING THE TOXICITY ASSESSMENT PROCESS. CANCER POTENCY FACTORS (CPFS) WERE IDENTIFIED FOR

POTENTIAL CARCINOGENIC CONTAMINANTS, AND REFERENCE DOSES (RFDs) WERE IDENTIFIED FOR CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. CPFS AND RFDs USED FOR THE TOXICITY ASSESSMENT ARE PRESENTED IN TABLE 2.

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG-DAY)⁻¹, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG-DAY, TO PROVIDE AN UPPER BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED.

REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDs, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDs, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDs ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDs WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR.

RISK CHARACTERIZATION

EXCESS LIFETIME CANCER RISKS FOR THE HRANICA LANDFILL SITE WERE DETERMINED BY MULTIPLYING THE DAILY INTAKE OF CHEMICALS FROM ENVIRONMENTAL MEDIA BY THE CANCER POTENCY FACTORS. THESE RISKS ARE PROBABILITIES EXPRESSED IN SCIENTIFIC NOTATION (I.E., 1E-6). AN EXCESS LIFETIME CANCER RISK OF 1E-6 INDICATES THAT AN INDIVIDUAL HAS A ONE IN A MILLION CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME. THE EPA RECOMMENDED UPPER BOUND FOR LIFETIME CANCER RISKS IS BETWEEN 1E-4 AND 1E-7, HOWEVER, THE POINT OF DEPARTURE, AS DESCRIBED IN THE NCP, IS CONSIDERED TO BE 1E-6. SEE 40 CFR 300.430.

THE ESTIMATED EXCESS LIFETIME CANCER RISKS FOR EACH OF THE EXPOSURE PATHWAYS ARE PRESENTED BELOW:

EXPOSURE TO GROUNDWATER

POPULATION	ROUTE OF EXPOSURE			
	INGESTION	DERMAL CONTACT	INHALATION	TOTAL
OFFSITE ADULT	4.1E-7	3.3E-7	1.7E-7	9.1E-7
OFFSITE CHILD	2.5E-7	1.9E-7	2.8E-7	7.3E-7

EXPOSURE TO ASH PILE AREA SOILS

POPULATION	ROUTE OF EXPOSURE			
	INGESTION/DERMAL CONTACT	INHALATION	TOTAL	
ADULT TRESPASSER	9.8E-6	5.0E-10	9.8E-6	
CHILD TRESPASSER	7.3E-6	2.8E-10	7.3E-6	
OFFSITE ADULT	N/A	1.3E-7	1.3E-7	
OFFSITE CHILD	N/A	2.2E-7	2.2E-7	

EXPOSURES TO NON-ASH PILE AREA SOILS

POPULATION	ROUTE OF EXPOSURE			
	INGESTION/DERMAL CONTACT	INHALATION	TOTAL	

ADULT TRESPASSER	1.5E-6	1.7E-10	1.5E-6
CHILD TRESPASSER	1.1E-6	9.5E-11	1.1E-6
OFFSITE ADULT	N/A	4.6E-8	4.6E-8
OFFSITE CHILD	N/A	7.6E-8	7.6E-8

EXPOSURES TO SOIL GAS

POPULATION	ROUTE OF EXPOSURE	
	INHALATION	TOTAL
ADULT TRESPASSER	5.4E-10	5.4E-10
CHILD TRESPASSER	3.0E-10	3.0E-10
OFFSITE ADULT	1.4E-7	1.4E-7
OFFSITE CHILD	2.4E-7	2.4E-7

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (I.E., THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATION IN A GIVEN MEDIUM TO THE CONTAMINANT'S REFERENCE DOSE). THE HQS FOR ALL CONTAMINANTS IN A MEDIUM ARE ADDED TO OBTAIN THE HAZARD INDEX (HI). THE HI PROVIDES A REFERENCE POINT FOR GAUGING THE SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA. A HAZARD INDEX LESS THAN OR EQUAL TO 1 INDICATES THAT THERE IS NO SIGNIFICANT RISK OF ADVERSE HEALTH EFFECTS.

THE HIS DERIVED FOR EACH MEDIUM ARE SUMMARIZED BELOW:

EXPOSURE TO GROUNDWATER

POPULATION	ROUTE OF EXPOSURE		
	INGESTION	DERMAL CONTACT	INHALATION
OFFSITE ADULT	2.8E-1	4.8E-02	7.6E-4
OFFSITE CHILD	2.9E-1	4.7E-2	2.1E-3
			TOTAL
			3.3E-1
			3.4E-1

EXPOSURE TO ASH PILE AREA SOILS

POPULATION	ROUTE OF EXPOSURE		
	INGESTION	DERMAL CONTACT	INHALATION
ADULT TRESPASSER	1.2	4.0E-4	1.2
CHILD TRESPASSER	4.4	1.1E-4	4.4
OFFSITE ADULT	N/A	1.0E-1	1.0E-1
OFFSITE CHILD	N/A	2.9E-1	2.9E-1

EXPOSURE TO NON-ASH PILE AREA SOILS

POPULATION	ROUTE OF EXPOSURE		
	INGESTION/DERMAL CONTACT	INHALATION	TOTAL
ADULT TRESPASSER	1.4E-1	5.4E-5	1.4E-1
CHILD TRESPASSER	5.2E-1	1.5E-4	5.2E-1
OFFSITE ADULT	N/A	1.4E-2	1.4E-2
OFFSITE CHILD	N/A	3.9E-2	3.9E-2

EXPOSURE TO SOIL GAS

POPULATION	ROUTE OF EXPOSURE	
	INHALATION	TOTAL
ADULT TRESPASSER	2.9E-4	2.9E-4
CHILD TRESPASSER	8.0E-4	8.0E-4
OFFSITE ADULT	7.8E-2	7.8E-2
OFFSITE CHILD	2.2E-1	2.2E-1

THE RESULTS OF THE ESTIMATED EXCESS LIFETIME CANCER RISKS AND NONCARCINOGENIC HAZARD INDICES INDICATE THE PRIMARY ADVERSE HEALTH RISK POSED BY THE HRANICA LANDFILL SITE IS DUE TO INGESTION AND DERMAL CONTACT WITH THE ASH PILE AREA SOILS FOR EITHER AN ADULT OR CHILD TRESPASSER. RISK ESTIMATES FOR OFFSITE EXPOSURE TO GROUNDWATER FROM THE DEEP AQUIFER AND EXPOSURES TO SOIL GAS INDICATE ACCEPTABLE RISKS TO HUMAN HEALTH. CANCER RISKS FOR EXPOSURE TO THE NON-ASH PILE AREAS SLIGHTLY EXCEED THE TARGET RISK OF 1E-6, BUT THEY ARE STILL WITHIN THE EPA RECOMMENDED GUIDELINES. THUS, IT IS THE HAZARD INDEX THAT JUSTIFIES A REMEDIAL ACTION AT THIS SITE, NOT THE CANCER RISK.

DUE TO THE POSSIBILITY OF EXPOSURE TO MULTIPLE MEDIA, THE RISK ESTIMATES

HAVE ALSO BEEN SUMMED OVER THE ENVIRONMENTAL MEDIA. TWO RISK CHARACTERISTICS HAVE BEEN EVALUATED INCLUDING EXPOSURE TO ALL MEDIA EXCEPT THE NON-ASH PILE AREA SOILS AND EXPOSURE TO ALL MEDIA EXCEPT THE ASH PILE AREA SOILS. THE RESULTS OF THIS EVALUATION, PRESENTED IN TABLE 3, INDICATE THAT THE ONLY SIGNIFICANT HEALTH HAZARD POSED BY THE HRANICA LANDFILL SITE IS DUE TO EXPOSURE TO THE ASH PILE AREA SOILS.

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THE ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT.

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III. DESCRIPTION OF ALTERNATIVES

A NUMBER OF REMEDIAL ALTERNATIVES WERE DEVELOPED IN THE FS TO SIGNIFICANTLY REDUCE THE RISK TO PUBLIC HEALTH AND THE ENVIRONMENT FROM INCIDENTAL CONTACT WITH OR INGESTION OF THE ASH PILE AREA SOIL (OU1). THE FOLLOWING SECTIONS BRIEFLY SUMMARIZE EACH OF THESE ALTERNATIVES.

ALTERNATIVE 1 - NO ACTION

EVALUATION OF THE NO ACTION ALTERNATIVE IS REQUIRED BY THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP). THIS ALTERNATIVE SERVES AS A POINT OF REFERENCE FOR COMPARING ALL OTHER ALTERNATIVES. IF OTHER ALTERNATIVES OFFER NO SUBSTANTIAL ADVANTAGES OVER THE NO ACTION ALTERNATIVE, NO ACTION MAY BE CONSIDERED APPROPRIATE. TOTAL COST FOR THIS ALTERNATIVE IS \$0.

ALTERNATIVE 2 - MONITORING, ACCESS RESTRICTIONS, AND INSTITUTIONAL CONTROLS

THIS ALTERNATIVE INCLUDES AN ENVIRONMENTAL MONITORING PROGRAM, ACCESS RESTRICTIONS, AND PROVISION OF INSTITUTIONAL CONTROLS. THE MONITORING LOCATIONS WOULD INCLUDE EXISTING AND PROPOSED MONITORING WELLS, SEEPS AND SPRINGS, AND SURFACE WATERS. THE DATA WOULD AID IN THE EVALUATION OF CONTAMINANT MIGRATION FROM THE SITE AND VARIATIONS IN WATER QUALITY. THE CONTINUED MONITORING PROGRAM WOULD ALSO EVALUATE HEALTH RISK VARIATIONS OF DOWNGRAIDENT RECEPTORS.

INSTITUTIONAL CONTROLS WOULD PROHIBIT FUTURE DEVELOPMENT AND POTABLE USE OF ONSITE GROUNDWATER AND LIMIT UNAUTHORIZED ACCESS TO THE SITE. INSTITUTIONAL CONTROLS WOULD INCLUDE FILING DEED RESTRICTIONS TO PROHIBIT THE FOLLOWING:

1. DEVELOPMENT OF WELLS AT THE SITE FOR USE AS DRINKING WATER, BATHING WATER, OR OTHER DOMESTIC USES THAT WOULD EXPOSE PEOPLE OR ANIMALS TO THE GROUNDWATER.
2. EXCAVATION OR DRILLING OF ANY TYPE WHICH MAY DISTURB AREAS OF COVER PLACEMENT OR RECONSTRUCTION, WITH THE EXCEPTION OF ANY CHARACTERIZATIONS WHICH MAY BECOME NECESSARY.
3. USE OF THE SITE THAT MAY PERMIT CONTACT WITH SOILS DETERMINED BY THE ENDANGERMENT ASSESSMENT TO PRESENT A POTENTIAL UNACCEPTABLE HEALTH RISK.
4. USE OF THE SITE THAT WOULD ALLOW FREE PUBLIC ACCESS.

A FENCE WOULD BE CONSTRUCTED AROUND THE PROPERTY BOUNDARY TO PROVIDE A PHYSICAL BARRIER TO LIMIT UNAUTHORIZED ACCESS TO THE SITE. THE FENCE WOULD BE AN EIGHT-FOOT HIGH CHAIN LINKED FENCE, TOPPED WITH THREE STRANDS OF BARBED WIRE. THIS WOULD PREVENT ACCESS TO THE ASH PILES AND MONITORING WELLS, PRECLUDE FUTURE SITE DISTURBANCES OR WASTE DUMPING, AND PREVENT ACCESS BY GAME ANIMALS. SEVERAL GATES WILL ALLOW AUTHORIZED ACCESS TO THE SITE. THE CAPITAL COST FOR THIS ALTERNATIVE IS \$269,000

AND THE NET PRESENT WORTH (NPW) COST WOULD BE \$679,000, ASSUMING 30 YEARS OF OPERATION AND MAINTENANCE (O&M) AT 5 PERCENT INTEREST.

ALTERNATIVE 3A - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, REPAIRS TO THE ASH PILE COVER, AND CAPPING OTHER AREAS WITH LEAD CONTAMINATION

ALTERNATIVE 3A INCLUDES THE SAME MONITORING, INSTITUTIONAL CONTROLS, AND ACCESS RESTRICTIONS AS DESCRIBED IN ALTERNATIVE 2. IN ADDITION, REPAIRS WOULD BE MADE TO THE ASH PILE COVER THAT WAS DISTURBED SUBSEQUENT TO ITS INITIAL PLACEMENT IN 1984, AND OTHER SELECT AREAS WHERE THE CONCENTRATION OF LEAD EXCEEDS 300 PPM WOULD BE CAPPED. THE CAP WOULD BE CONSTRUCTED TO MEET THE MINIMUM SOLID WASTE LANDFILL CLOSURE CRITERIA CONTAINED IN 25 PA CODE SECTION 75.264 (O) AND (V) REGARDING CLOSURE AND POST-CLOSURE OF HAZARDOUS WASTE LANDFILLS.

THE REPAIR OF THE CAP WOULD REQUIRE THE FOLLOWING:

1. GRADING AND COMPACTION OF THE EXISTING GROUND SURFACE.
2. PLACEMENT AND COMPACTION OF A TWO-FOOT THICK CLAY COVER.
3. TEMPORARY DUST CONTROL DURING GRADING AND COVER PLACEMENT.
4. REVEGETATION OF THE COVER.
5. LONG-TERM MONITORING OF THE COVER FOR EROSION AND SETTLEMENT DAMAGE.

THE CAPITAL COST FOR IMPLEMENTING ALTERNATIVE 3A IS \$519,000, AND THE NPW COST WOULD BE \$1,037,000, ASSUMING 30 YEARS O&M AT 5 PERCENT INTEREST.

ALTERNATIVE 3B - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, REPAIRS TO THE ASH PILE COVER, CAPPING OTHER AREAS WITH LEAD CONTAMINATION, AND INCREASING THE THICKNESS OF THE ASH PILE COVER TO THREE FEET.

ALTERNATIVE 3B INCLUDES ALL OF THE COMPONENTS OF ALTERNATIVE 3A WITH AN ADDITIONAL ONE FOOT OF CLAY ADDED TO THE CAP OVER THE ENTIRE ASH PILE. THE ADDITIONAL CAP THICKNESS WOULD BE IMPLEMENTED BY THE SAME PROCEDURE AS DESCRIBED IN ALTERNATIVE 3A:

1. GRADING AND COMPACTING THE EXISTING GROUND SURFACE.
2. PLACEMENT AND COMPACTION OF AN ADDITIONAL ONE-FOOT CLAY COVER OVER THE ENTIRE ASH PILE AREA.
3. TEMPORARY DUST CONTROL DURING GRADING AND COVER PLACEMENT.
4. REVEGETATION OF THE COVER.
5. LONG TERM MONITORING OF THE COVER FOR EROSION OR SETTLEMENT DAMAGE.

THE CAPITAL COST FOR IMPLEMENTING 3B WOULD BE \$668,000 AND THE NPW COST WOULD BE \$1,401,000, ASSUMING 30 YEARS O & M AT 5 PERCENT INTEREST.

ALTERNATIVE 4 - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, EXCAVATION, AND OFFSITE DISPOSAL OF SOIL/WASTE, AND COVER

ALTERNATIVE 4 INCLUDES THE SAME MONITORING, ACCESS RESTRICTIONS, AND INSTITUTIONAL CONTROLS AS ALTERNATIVE 2 WITH THE ADDITION OF EXCAVATION AND OFFSITE DISPOSAL OF 9800 CUBIC YARDS OF SOIL/WASTE MATERIALS EXCAVATED FROM THE ASH PILE AREA. THE EXCAVATION OF THE SOIL/WASTE MATERIALS WOULD INVOLVE THE FOLLOWING:

1. EXCAVATION AND STOCKPILING OF THE TOP FOOT OF THE INTACT COVER

FROM THE ASH PILE AREA FOR USE IN THE FINAL COVER.

2. EXCAVATION, REMOVAL, AND OFFSITE DISPOSAL OF THE SECOND FOOT OF THE COVER OVER THE ASH PILE AREA.
3. EXCAVATION AND OFFSITE DISPOSAL OF ASH AND SOILS CONTAMINATED BY VIRTUE OF THEIR BEING AN ADMIXTURE OF SOIL AND ASH.
4. GRADING AND COMPACTING THE SUBGRADE SURFACE.
5. PLACEMENT AND COMPACTION OF A TWO-FOOT THICK CLAY COVER.
6. TEMPORARY DUST CONTROL DURING GRADING AND COVER PLACEMENT.
7. REVEGETATION OF THE COVER.
8. LONG TERM MONITORING OF THE COVER FOR EROSION OR SETTLEMENT DAMAGE.

THE CAPITAL COST FOR IMPLEMENTING ALTERNATIVE 4 WOULD BE \$3,920,000, AND THE NPW COST WOULD BE \$4,653,000, ASSUMING 30 YEARS O&M AT 5 PERCENT INTEREST.

ALTERNATIVE 5 - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, EXCAVATION, AND ONSITE DISPOSAL

ALTERNATIVE 5 INCLUDES THE SAME MONITORING, ACCESS RESTRICTIONS, AND INSTITUTIONAL CONTROLS DISCUSSED IN ALTERNATIVE 2 ALONG WITH THE CONSTRUCTION OF AN ONSITE LANDFILL, PLACEMENT OF 9800 CUBIC YARDS OF ASH PILE AREA SOILS IN THE LANDFILL, CLOSURE OF THE LANDFILL, AND PLACEMENT OF FOUR ADDITIONAL MONITORING WELLS CLUSTERS AROUND THE NEWLY CONSTRUCTED LANDFILL.

THE ONSITE LANDFILL WOULD BE CONSTRUCTED IN THE ASH PILE AREA. THIS WOULD ENABLE THE LANDFILL TO BE BUILT ON A RELATIVELY FLAT PORTION OF THE SITE AND IN AN AREA THAT WOULD PROVIDE AN IMPERMEABLE BARRIER OVER THE SHALLOW GROUNDWATER SYSTEM. THE LANDFILL WOULD BE CONSTRUCTED FOLLOWING PADER AND EPA REGULATIONS GOVERNING THE CONSTRUCTION OF A HAZARDOUS WASTE LANDFILL. IN ADDITION, FOUR ADDITIONAL MONITORING WELL CLUSTERS WOULD BE INSTALLED IN THE SHALLOW AND INTERMEDIATE AQUIFERS AT THE TIME OF CONSTRUCTION OF THE LANDFILL. THIS WOULD PROVIDE BACKGROUND AND LONG TERM MONITORING FOR THE ONSITE LANDFILL. PREPARATION, CONSTRUCTION, AND DISPOSAL IN THE LANDFILL WOULD INCLUDE THE FOLLOWING:

1. CLEARING THE AREA.
2. EXCAVATION AND STOCKPILING OF THE TOP FOOT OF THE INTACT COVER FROM THE ASH PILE AREA FOR USE IN THE FINAL COVER.
3. EXCAVATION AND STOCKPILING THE SECOND FOOT OF THE COVER OVER THE ASH PILE AND THE ASH PILE WASTE.
4. GRADING AND COMPACTING THE SUBGRADE SURFACE.
5. USE OF EROSION, SEDIMENT, AND DUST CONTROL DURING ALL PREPARATION AND WASTE HANDLING ACTIVITIES.
6. CONSTRUCTION OF A LINER OVER THE EXISTING SUBGRADE CONSISTING OF A 3-FOOT THICK LAYER OF COMPACTED CLAY (PERMEABILITY OF 1×10^{-7} CM/SEC OR LESS), A FLEXIBLE MEMBRANE LINER (FML), A LEACHATE COLLECTION ZONE (PERMEABILITY OF 1×10^{-3} CM/SEC OR GREATER), AND A GEOTEXTILE LAYER.
7. PLACEMENT AND COMPACTION OF THE ASH PILE SOILS IN HORIZONTAL LAYERS TO ALLOW COMPACTION AND MINIMIZE LONG TERM SETTLEMENT OF THE CAP.
8. PLACEMENT OF A CLEAN SOIL COVER DURING ANY INTERRUPTIONS OF

WORK TO PREVENT WIND AND WATER EROSION.

9. CONSTRUCTION OF A CAP HAVING A MINIMUM 5 PERCENT GRADE TO A MAXIMUM 25 PERCENT GRADE. THE COVER WILL CONSIST OF 2-FOOT THICK COMPACTED CLAY LAYER (PERMEABILITY OF 1×10^{-7} CM/SEC OR LESS), A FML, A 12-INCH THICK HORIZONTAL DRAINAGE LAYER, A GEOTEXTILE LAYER, AND A 2-FOOT THICK COVER OF SOIL SEEDED WITH PERMANENT EROSION RESISTANT VEGETATION.

SURFACE WATERS AND LEACHATE WITHIN THE LANDFILL WOULD BE COLLECTED, PRETREATED, AND DISCHARGED TO THE PUBLICLY OWNED TREATMENT WORKS. A SEWER LINE HAS BEEN FUNDED ALONG EKASTOWN ROAD. IF THE SEWER IS IN PLACE PRIOR TO COMPLETION OF THE REMEDIAL ACTION, A TAP-IN WOULD BE REQUESTED. IF NO SEWER WERE AVAILABLE, THE LEACHATE WOULD BE PRE-TREATED, IF NECESSARY, AND TRANSPORTED TO THE FAWN-FRAZIER PUBLICLY OWNED TREATMENT WORKS. THE CAPITAL COST TO IMPLEMENT ALTERNATIVE 5 WOULD BE \$3,375,000, AND THE NPW COST WOULD BE \$4,223,000, ASSUMING 30 YEARS O&M AT 5 PERCENT INTEREST.

ALTERNATIVE 6 - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, STABILIZATION (CHEMICAL AND PHYSICAL), AND COVER

ALTERNATIVE 6 INCLUDES THE SAME MONITORING, ACCESS RESTRICTIONS, AND INSTITUTIONAL CONTROLS AS ALTERNATIVE 2 WITH THE ADDITION OF CHEMICAL AND PHYSICAL STABILIZATION PRECESSES. A TOTAL OF 9800 CUBIC YARDS OF SOIL WILL BE EXCAVATED AND THEN STABILIZED. THE STABILIZATION PROCESS WOULD INCLUDE THE FOLLOWING PROCEDURES;

1. THE REMOVAL AND STOCKPILING OF 1 FOOT OF SOIL FROM A 25-FOOT WIDE STRIP ACROSS THE WIDTH OF THE ASH PILE.
2. THE REMOVAL AND STOCKPILING OF THE LOWER FOOT OF THE SOIL COVER AND THE ASH FROM A 15-FOOT WIDE STRIP ACROSS THE WIDTH OF THE ASH PILE.
3. STABILIZATION OF THE TOP FOOT OF THE NATURAL SOIL SUBGRADE USING AN ADDITIVE TO REDUCE THE SOLUBILITY (FIXATION) OF LEAD AND A CEMENTING AGENT TO BOND THE SOIL MASS INTO A COHESIVE STRUCTURE.
4. THE REMOVAL OF A ONE FOOT LAYER FROM THE ADJACENT PORTION OF THE ASH PILE AND PLACEMENT OVER THE STABILIZED SUBGRADE.
5. STABILIZATION AND COMPACTION OF THE MATERIAL PLACED ON THE SUBGRADE USING THE FIXATION AND CEMENTING AGENTS.
6. CONTINUED REMOVAL OF THE ASH PILE SOILS IN 11-FOOT LIFTS UNTIL THE SUBGRADE IS REACHED.
7. AS EACH FOOT OF ASH PILE MATERIAL IS REMOVED, IT WOULD BE PLACED ON THE PREVIOUSLY PLACED MATERIALS, STABILIZED, AND COMPACTED.
8. WHEN THE SUBGRADE IS EXPOSED, IT WOULD BE STABILIZED SO THAT AN ADJACENT SECTION OF THE ASH PILE CAN BE REMOVED AND STABILIZED.
9. THE PROCESS WOULD CONTINUE UNTIL ALL OF THE ASH PILE SOILS, INCLUDING THE STOCKPILE, HAVE BEEN STABILIZED AND COMPACTED.
10. THE FINAL DISPOSAL AREA WOULD BE COVERED WITH TWO FEET OF SOIL AND REVEGETATED.

THE CAPITAL COST TO IMPLEMENT ALTERNATIVE 6 WOULD BE \$2,060,000, AND THE TOTAL NPW COST WOULD BE \$2,793,000, ASSUMING 30 YEARS O&M AT 5 PERCENT INTEREST.

ALTERNATIVE 7 - MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, STABILIZATION (VITRIFICATION), AND COVER

ALTERNATIVE 7 INCLUDES THE MONITORING, ACCESS RESTRICTIONS, AND INSTITUTIONAL CONTROLS DISCUSSED IN ALTERNATIVE 2 WITH THE ADDITION OF IN-SITU VITRIFICATION OF THE ASH PILE AREA SOILS, PLACEMENT OF A 2-FOOT SOIL COVER, AND REVEGETATION. A TOTAL OF 9800 CUBIC YARDS OF SOIL WILL VITRIFIED IN THIS MANNER.

THE VITRIFICATION PROCESS WOULD INVOLVE THE FOLLOWING:

1. CONSTRUCTION OF A POWER LINE TO THE SITE.
2. THE REMOVAL AND STOCKPILING OF THE TOP FOOT OF SOIL FROM A 30 BY 60-FOOT AREA OF THE ASH PILE.
3. INSTALLATION OF FOUR ELECTRODES TO A DEPTH OF 3 FEET BELOW THE ASH PILE ON A 30 BY 30-FOOT SQUARE GRID PATTERN IN THE CLEARED AREA.
4. VITRIFICATION OF THE GRID FOR 150 TO 500 HOURS. IF NECESSARY, A LAYER OF GRAPHITE WOULD BE PLACED ACROSS THE GROUND SURFACE TO INITIATE THE VITRIFICATION.
5. PLACEMENT OF TWO ADDITIONAL ELECTRODES TO FORM A SECOND SQUARE GRID FOLLOWED BY VITRIFICATION OF THE GRID.
6. REMOVAL OF THE SOIL FROM A THIRD GRID, AND PLACEMENT OVER THE FIRST GRID WHEN COOL.
7. THE PROCESS WOULD CONTINUE UNTIL THE ENTIRE ASH PILE IS STABILIZED.
8. PLACEMENT OF AN ADDITIONAL FOOT OF SOIL OVER THE ONE-FOOT COVER PLACED DURING THE VITRIFICATION FOLLOWED BY REVEGETATION OF THE SOIL.

THE CAPITAL COST TO IMPLEMENT THIS ALTERNATIVE WOULD BE \$10,349,000 AND THE TOTAL NPW COST WOULD BE \$11,082,000, ASSUMING 30 YEARS O&M AT 5% INTEREST.

#CAA

IV COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA EVALUATED EACH OF THE REMEDIAL ALTERNATIVES DEVELOPED FOR THE HRANICA LANDFILL SITE WITH RESPECT TO NINE SPECIFIC CRITERIA. THE FOLLOWING SECTIONS PRESENT A BRIEF DISCUSSION OF EACH OF THE EVALUATION CRITERIA AND A COMPARATIVE ANALYSIS OF EACH OF THE REMEDIAL ALTERNATIVES BASED ON THE NINE EVALUATION CRITERIA.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THIS CRITERION ADDRESSES WHETHER A REMEDIAL ALTERNATIVE WILL ADEQUATELY PROTECT HUMAN HEALTH AND THE ENVIRONMENT. THE EVALUATION CRITERIA SHOULD CONSIDER; THE REDUCTION OF RISK; ANY UNACCEPTABLE IMPACTS; CONTROL OF HAZARDS (I.E., TOXICITY, MOBILITY); AND MINIMIZATION OF SHORT-TERM IMPACTS.

THE PRIMARY HUMAN HEALTH RISK ASSOCIATED WITH THE SITE IS FROM ONSITE DERMAL CONTACT OR INCIDENTAL INGESTION OF THE ASH PILE SOILS. THE EXCESS LIFETIME CANCER RISK DUE TO ONSITE EXPOSURE TO THE ASH PILE SOILS HAS BEEN ESTIMATED TO BE $9.8E-6$, WHICH IS LOWER THAN THE EPA'S RECOMMENDED UPPER BOUND OF $1E-4$ TO JUSTIFY A REMEDIAL ACTION. HOWEVER, AS TABLE 3 INDICATES, THE HAZARD INDEX FOR A TRESPASSER (EITHER ADULT OR CHILD) IS ABOVE THE TARGET GOAL OF 1.0. THEREFORE, THE PRIMARY GOAL OF THE REMEDIAL ALTERNATIVES IS TO ELIMINATE OR REDUCE THE ONSITE EXPOSURE TO THE ASH PILE SOILS, IN ORDER TO REDUCE THE HAZARD INDEX TO BELOW THE TARGET OF ONE.

ALTERNATIVES 3A, 3B, 4, 5, 6, 7, AND TO A LESSER EXTENT 2, WILL ALL REDUCE THE RISK OF DERMAL CONTACT OR INGESTION OF THE ASH PILE SOILS. ALTERNATIVE 4 WILL ELIMINATE THE SOURCE OF CONTAMINATION, PROVIDE A PERMANENT SOLUTION, AND ELIMINATE ANY LONG-TERM ADVERSE HEALTH EFFECTS

ASSOCIATED WITH THE SITE. ALTERNATIVES 6 AND 7 WILL REDUCE THE MOBILITY AND TOXICITY OF THE CONTAMINATED SOIL, AND WILL BE MORE PROTECTIVE OF HUMAN HEALTH THAN ALTERNATIVES 3A, 3B, AND 5 IN THE EVENT OF A FAILURE OF THE CLAY CAP. ALTERNATIVES 4, 5, 6, AND 7 WILL INCREASE THE POTENTIAL FOR SHORT-TERM IMPACTS ON HUMAN HEALTH DUE TO THE DISTURBANCE OF THE ASH PILE. ALTERNATIVE 1 DOES NOT PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

2. COMPLIANCE WITH ARARS

THIS CRITERION ADDRESSES WHETHER OR NOT A REMEDY WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ESTABLISHED BY STATE AND FEDERAL ENVIRONMENTAL LAWS AND/OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

A COMPLETE LISTING OF ALL SITE-RELATED ACTION, AND LOCATION-SPECIFIC ARARS IS PRESENTED IN TABLE 4. ALL OF THE ALTERNATIVES WILL MEET ARARS, AND NO WAIVERS WILL BE REQUIRED. THE CREATION OF AN ONSITE LANDFILL OR CLOSURE OF THE EXISTING LANDFILL WOULD HAVE TO MEET ALL APPLICABLE STATE AND FEDERAL REGULATIONS REGARDING CLOSURE AND POST-CLOSURE CARE OF A LANDFILL. THE OCCUPATIONAL HEALTH AND SAFETY ACT WILL BE APPLICABLE FOR THE PROTECTION OF WORKER SAFETY DURING IMPLEMENTATION OF ANY OF THE REMEDIAL ALTERNATIVES. THE EXCAVATION AND OFFSITE DISPOSAL ALTERNATIVE WOULD HAVE TO MEET HAZARDOUS MATERIALS TRANSPORTATION REGULATIONS. MEASURES WOULD BE TAKEN TO ENSURE THAT SURFACE RUNOFF FROM ANY OF THE CAPPING ALTERNATIVES MEETS NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEMS (NPDES) LIMITATIONS AND FEDERALLY-APPROVED STATE WATER QUALITY REGULATIONS. SEE 33 USC SECTION 402; 40 CFR PART 122 AND 25 PA CODE 93.

LONG-TERM EFFECTIVENESS AND PERMANENCE

THIS CRITERION REFERS TO THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE THE CLEANUP GOALS HAVE BEEN MET.

THE MOST EFFECTIVE LONG-TERM ALTERNATIVE IS ALTERNATIVE 4, WHICH PROVIDES A PERMANENT SOLUTION BY ELIMINATING THE SOURCE OF THE CONTAMINATION. ALTERNATIVES 6 AND 7 PROVIDE A MORE PERMANENT SOLUTION THAN THE REMAINING ALTERNATIVES BY REDUCING THE MOBILITY AND TOXICITY OF THE CONTAMINANT SOURCE. ALTERNATIVES 3A, 3B, AND 5 MAY REQUIRE FUTURE REMEDIATION IF THE CLAY CAP FAILS. ALTERNATIVES 1 AND 2 DO NOT OFFER AN EFFECTIVE LONG-TERM SOLUTION.

4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

THIS CRITERION ADDRESSES THE STATUTORY PREFERENCE FOR SELECTING A REMEDIAL ALTERNATIVE THAT PERMANENTLY REDUCES THE TOXICITY, MOBILITY, OR VOLUME OF THE HAZARDOUS WASTE THROUGH TREATMENT.

SINCE THE PRIMARY EXPOSURE PATHWAY ASSOCIATED WITH THE HRANICA LANDFILL SITE IS THE ONSITE DERMAL CONTACT OR INGESTION OF THE ASH PILE SOILS, ALTERNATIVES 3A, 3B, 4, 5, 6, AND 7 WILL ALL REDUCE THE MOBILITY OF THE ASH PILE SOILS WITH RESPECT TO THE PRIMARY EXPOSURE PATHWAY. ALTERNATIVE 4, EXCAVATION WITH OFFSITE DISPOSAL, WOULD RESULT IN THE GREATEST REDUCTION IN THE TOXICITY, MOBILITY AND VOLUME OF THE PCOCS BY REMOVING THE SOURCE. ALTERNATIVE 7, VITRIFICATION, AND ALTERNATIVE 6, STABILIZATION, WOULD REDUCE THE TOXICITY AND MOBILITY OF THE WASTE TO A GREATER EXTENT THAN ALTERNATIVES 3A AND 3B, HOWEVER, THESE ALTERNATIVES MAY INCREASE THE VOLUME OF THE WASTE. ALTERNATIVE 5 WOULD LIMIT DERMAL CONTACT WITH THE ASH PILE SOILS AND REDUCE MOBILITY OF THE PCOCS. ALTERNATIVES 3A AND 3B WOULD LIMIT DERMAL CONTACT WITH THE ASH PILE SOILS, HOWEVER, THE TOXICITY AND VOLUME OF THE WASTE WOULD NOT BE REDUCED. ALTERNATIVES 1 AND 2 WOULD NOT REDUCE THE TOXICITY, MOBILITY, OR VOLUME OF THE WASTE.

5. SHORT-TERM EFFECTIVENESS

THIS CRITERION REFERS TO THE LENGTH OF TIME REQUIRED TO ACHIEVE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, AND TO ANY ADVERSE IMPACTS POSED DURING THE IMPLEMENTATION OF THE REMEDIAL ALTERNATIVE.

ALTERNATIVE 3A WOULD ADEQUATELY PROTECT HUMAN HEALTH AND THE ENVIRONMENT, AND COULD BE IMPLEMENTED IN APPROXIMATELY 4 MONTHS. THIS ALTERNATIVE IS ANTICIPATED TO HAVE LITTLE OR NO SHORT-TERM EFFECT ON THE SURROUNDING COMMUNITY OR THE WORKERS DURING THE CONSTRUCTION PHASE. ALTERNATIVES 3B, 4, 5, 6, AND 7 WOULD BE LESS EFFECTIVE SHORT-TERM, DUE TO INCREASED CONSTRUCTION SCHEDULES. THE DISTURBANCE OF THE ASH PILE SOILS MAY ALSO RESULT IN ADVERSE SHORT-TERM HEALTH IMPACTS. ALTERNATIVES 1 AND 2 DO NOT PROVIDE ADEQUATE SHORT-TERM PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

6. IMPLEMENTABILITY

THIS CRITERION DESCRIBES THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDIAL ALTERNATIVE, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE SELECTED SOLUTION.

ALL OF THE ALTERNATIVES PROPOSED FOR THE SITE CAN BE IMPLEMENTED. THE VITRIFICATION AND SOLIDIFICATION ALTERNATIVES WOULD BE THE MOST DIFFICULT TO IMPLEMENT BECAUSE TREATABILITY TESTS WOULD BE REQUIRED TO DETERMINE THE STABILITY OF THE MATERIAL OVER TIME.

7. COST

THIS CRITERION ADDRESSES THE CAPITAL COST FOR MATERIALS, EQUIPMENT, ETC. AND THE O&M COSTS.

ASSUMING A NET PRESENT WORTH (NPW) COST INCLUDING 30 YEARS OF O&M COSTS, ALTERNATIVE 7, VITRIFICATION, WOULD BE THE MOST EXPENSIVE ALTERNATIVE TO IMPLEMENT WITH A NPW COST OF \$11,082,000. DUE TO THE RELATIVELY LOW RISK TO HUMAN HEALTH POSED BY THE SITE, THIS COST CAN NOT BE JUSTIFIED. ALTERNATIVES 3A AND 3B ARE COMPARABLE WITH A COST OF \$1,037,000 AND \$1,401,000, RESPECTIVELY. HOWEVER, ALTERNATIVE 3B DOES NOT OFFER ANY SIGNIFICANT ADVANTAGES OVER ALTERNATIVE 3A. THEREFORE, ALTERNATIVE 3A IS THE MORE COST EFFECTIVE OF THE TWO. THE NPW COSTS FOR ALTERNATIVES 4, 5, AND 6 ARE \$4,653,000, \$4,223,000, AND \$2,793,000, RESPECTIVELY.

EPA HAS SELECTED ALTERNATIVE 3A. IT OFFERS THE MOST COST- EFFECTIVE SOLUTION, WHILE STILL PROVIDING ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

8. STATE ACCEPTANCE

THIS CRITERION INDICATES WHETHER, BASED ON ITS REVIEW OF THE REMEDIAL INVESTIGATION (RI), FEASIBILITY STUDY (FS), AND THE PROPOSED PLAN, THE STATE CONCURS WITH, OPPOSES, OR HAS NO COMMENT ON THE PREFERRED ALTERNATIVE.

THE PADER HAS CONCURRED WITH THE SELECTED REMEDY. THEY HAVE ALSO RAISED THE FOLLOWING CONCERNS:

1. PADER REQUESTED THAT THE CLAY CAP, WHICH WILL BE INSTALLED AS PART OF THE SELECTED REMEDY, MEET THE STANDARDS DESCRIBED IN 25 PA. CODE SECTION 75.264 (O) AND (V). EPA WILL ENSURE DURING THE REMEDIAL DESIGN PHASE THAT THE CAP MEETS THOSE STANDARDS.
2. PADER ALSO REQUESTED THAT FUGITIVE DUST EMISSIONS, WHICH WOULD BE GENERATED BY EARTH-MOVING EQUIPMENT DURING IMPLEMENTATION OF THE PREFERRED ALTERNATIVE, BE CONTROLLED IN ORDER TO COMPLY WITH 25 PA CODE SECTIONS 123.1 AND 123.2. DUST CONTROL IS PART OF THE SELECTED REMEDY AND WILL BE DONE TO COMPLY WITH THESE REGULATIONS.
3. PADER ALSO SUGGESTED THAT THE MUNICIPAL PORTION OF THE SITE BE

CLOSED ACCORDING TO THE STATE MUNICIPAL CLOSURE REGULATIONS AS PART OF THIS SUPERFUND ACTION (25 PA. CODE SECTIONS 273.221, 273.322 AND 273.334). THE MUNICIPAL PORTION OF THE SITE DOES NOT PRESENT A RISK TO HUMAN HEALTH OR THE ENVIRONMENT; REMEDIATION OF THIS AREA IS NOT PART OF THE SELECTED REMEDY. ACCORDINGLY, THIS AREA CANNOT BE CLOSED ACCORDING TO STATE REGULATIONS USING SUPERFUND MONIES. THE CLOSURE OF THAT PORTION OF THE SITE IS NOT PART OF THE SELECTED REMEDY.

9. COMMUNITY ACCEPTANCE

THIS CRITERION ASSESSES THE PUBLIC COMMENTS RECEIVED ON THE RI, FS, AND THE PROPOSED PLAN.

COMMUNITY INTEREST IS LOW AT THIS SITE. A PUBLIC MEETING WAS HELD ON JUNE 7, 1990, AT THE BUFFALO TOWNSHIP MUNICIPAL BUILDING. THIS MEETING LASTED APPROXIMATELY ONE HOUR, AND THE MEMBERS OF THE PUBLIC IN ATTENDANCE WERE ABLE TO HAVE ALL OF THEIR QUESTIONS ABOUT THE SITE ANSWERED. NO WRITTEN COMMENTS WERE RECEIVED DURING THE PUBLIC COMMENT PERIOD.

#DSR

V. DESCRIPTION OF THE SELECTED REMEDY

BASED UPON CONSIDERATIONS OF THE REQUIREMENTS OF CERCLA AND ON THE DETAILED EVALUATION OF THE ALTERNATIVES, EPA HAS DETERMINED THAT ALTERNATIVE 3A - MONITORING, INSTITUTIONAL CONTROLS, REPAIRS TO THE ASH PILE COVER, AND CAPPING OTHER AREAS WITH LEAD CONTAMINATION IS THE MOST APPROPRIATE REMEDY FOR THE HRANICA SITE IN BUFFALO TOWNSHIP, PENNSYLVANIA.

THIS ALTERNATIVE WILL INCLUDE A MONITORING PROGRAM USING EXISTING AND PROPOSED MONITORING LOCATIONS, SEEPS AND SPRINGS, AND SURFACE WATERS. THE DATA WILL ASSIST IN THE EVALUATION OF CONTAMINANT MIGRATION FROM THE SITE AND VARIATIONS IN WATER QUALITY. THE CONTINUED MONITORING PROGRAM WILL ALSO EVALUATE HEALTH RISK VARIATIONS OF DOWNGRADIENT RECEPTORS.

INSTITUTIONAL CONTROLS WILL PROHIBIT FUTURE DEVELOPMENT AND POTABLE USE OF SITE GROUNDWATER AND LIMIT UNAUTHORIZED ACCESS TO THE SITE. DEED RESTRICTIONS WILL BE FILED TO PROHIBIT THE FOLLOWING; DEVELOPMENT OF ONSITE WELLS FOR DRINKING WATER, BATHING WATER, OR OTHER DOMESTIC USES; EXCAVATION OR DRILLING WHICH MAY DISTURB COVERED OR RECONSTRUCTED AREAS, EXCEPT WHEN FUTURE CHARACTERIZATIONS BECOME NECESSARY; AND USE OF THE SITE THAT MAY PERMIT CONTACT WITH SOILS THAT MAY PRESENT A POTENTIAL HEALTH RISK.

A FENCE WILL BE CONSTRUCTED AROUND THE PROPERTY BOUNDARY TO LIMIT UNAUTHORIZED ACCESS. THE FENCE WILL BE AN EIGHT-FOOT HIGH, CHAIN LINKED FENCE, TOPPED WITH THREE STRANDS OF BARBED WIRE. THIS WOULD PREVENT ACCESS TO THE ASH PILES AND MONITORING WELLS, PRECLUDE FUTURE SITE DISTURBANCES OR WASTE DUMPING, AND PREVENT ACCESS BY GAME ANIMALS. SEVERAL GATES WILL ALLOW AUTHORIZED ACCESS TO THE SITE.

REPAIRS WILL BE MADE TO A 29,000 SQUARE-FOOT AREA OF THE ASH PILE COVER THAT WAS DISTURBED SUBSEQUENT TO ITS INITIAL PLACEMENT IN 1984. IN ADDITION, OTHER AREAS ON THE SITE WHERE THE LEAD CONTAMINATION EXCEEDS 300 PPM WILL ALSO BE CAPPED. THE PROCEDURE WILL CONSIST OF GRADING AND COMPACTING THE EXISTING GROUND SURFACE, PLACEMENT AND COMPACTION OF A COVER, TEMPORARY DUST CONTROL DURING GRADING AND COVER PLACEMENT, REVEGETATION OF THE COVER, AND LONG-TERM MONITORING OF THE COVER FOR EROSION AND SETTLEMENT DAMAGE. THE CAP WILL BE DESIGNED TO MEET STATE REGULATIONS CONCERNING CLOSURE AND POST-CLOSURE CARE OF HAZARDOUS WASTE LANDFILLS.

A GROUNDWATER VERIFICATION STUDY WILL ALSO BE PERFORMED TO DETERMINE WHETHER ANY REMEDIATION OF GROUNDWATER, BOTH ONSITE OR OFFSITE THAT IS NOT BEING ADDRESSED IN THE SELECTED REMEDY, IS REQUIRED. A SUBSEQUENT

ROD WILL BE WRITTEN THAT WILL ADDRESS ANY FURTHER REMEDIATION THAT MAY BE REQUIRED AT THIS SITE.

THE RATIONALE FOR SELECTION OF THIS ALTERNATIVE IS BASED ON FOUR FACTORS. FIRST, THE DRUMS AND CONTAMINATED SOIL REMOVED IN 1983-1984 GREATLY REDUCED THE HUMAN CANCER RISK TO AN ESTIMATED $9.8E-6$. BECAUSE OF THIS REMOVAL, THE MOST CONTAMINATED SOILS HAVE ALREADY BEEN DISPOSED OF OFFSITE, AND THE HEALTH RISK IS LOW. SECOND, THE PRIMARY HUMAN HEALTH RISK PRESENTED BY THE SITE IS TO TRESPASSERS FROM INCIDENTAL INGESTION OR DERMAL CONTACT WITH CONTAMINATED SOIL IN THE ASH PILE AREA, MAINLY DUE TO THE ELEVATED LEVELS OF LEAD. THIRD, THE HAZARD INDEX OF THE ONSITE SOILS IS GREATER THAN 1.0, SO THERE IS JUSTIFICATION FOR A REMEDIAL ACTION TO REDUCE THE HAZARD INDEX. FINALLY, THE SELECTED REMEDY OFFERS THE MOST COST-EFFECTIVE SOLUTION WHILE STILL PROVIDING ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

COST ESTIMATE FOR ALTERNATIVE 3A

CAPITAL COSTS

WORK PLAN		\$	49,000
GENERAL SITE WORK		\$	136,000
MONITORING WELL INSTALLATION		\$	36,000
SAMPLING AND ANALYSIS	35 AT \$2,200	\$	77,000
INSTITUTIONAL CONTROLS			
DEED RESTRICTIONS		\$	4,000
FENCING	4500 FT AT \$18.89/FT	\$	85,000
RECONSTRUCTION OF DISTURBED COVER AND COVERING OF OTHER AREAS WITH LEAD CONTAMINATION EXCEEDING 300 PPM		\$	132,000
TOTAL CAPITAL COSTS		\$	519,000

OPERATION AND MAINTENANCE COSTS

YEAR 1			
13 QUARTERLY SAMPLES (TCL)		\$	63,400
SAMPLING (2 TECHNICIANS)		\$	2,350
REPORTING		\$	1,700
MAINTENANCE		\$	14,000
TOTAL O&M COSTS FOR YEAR 1		\$	81,450

YEARS 2 THROUGH 30			
13 SEMIANNUAL SAMPLES (TCL METALS AND VOC'S)		\$	12,500
SAMPLING		\$	2,350
REPORTING		\$	1,700
MAINTENANCE		\$	14,000

TOTAL O&M COSTS FOR YEARS 2 THROUGH 30		\$	30,550
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NPW OF O&M COSTS FOR 30 YEARS (ASSUMING 5 PERCENT INTEREST RATE)		\$	518,000
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TOTAL NPW OF ALTERNATIVE NO. 3A		\$	1,037,000
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VI. STATUTORY DETERMINATIONS

EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO IMPLEMENT REMEDIAL ACTIONS THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. SECTION 121 OF CERCLA ALSO ESTABLISHES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES. THE SELECTED REMEDY MUST BE COST EFFECTIVE AND UTILIZE A PERMANENT SOLUTION TO THE MAXIMUM EXTENT PRACTICABLE. THE SELECTED REMEDIAL ACTION MUST COMPLY WITH ALL

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS SET FORTH BY STATE AND FEDERAL ENVIRONMENTAL REGULATIONS, UNLESS SUCH REQUIREMENTS ARE WAIVED IN ACCORDANCE WITH CERCLA SECTION 121. FINALLY, EPA MUST CONSIDER THE STATUTORY PREFERENCE FOR REMEDIAL ACTIONS THAT PERMANENTLY REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF THE SITE-RELATED WASTES. THE FOLLOWING SECTIONS DISCUSS HOW THE SELECTED REMEDY MEETS THE STATUTORY REQUIREMENTS AND PREFERENCES SET FORTH BY SECTION 121 OF CERCLA.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE RISK ASSESSMENT IDENTIFIED DERMAL CONTACT OR INCIDENTAL INGESTION OF THE ASH PILE SOILS AS THE ONLY SIGNIFICANT EXPOSURE PATHWAY HAVING AN ADVERSE EFFECT ON HUMAN HEALTH OR THE ENVIRONMENT. THE SELECTED REMEDY WOULD PROTECT HUMAN HEALTH AND THE ENVIRONMENT BY ELIMINATING DIRECT CONTACT WITH THE ASH PILE SOILS THROUGH ACCESS RESTRICTIONS AND PLACEMENT OF A TWO-FOOT CLAY CAP OVER THE CONTAMINATED SOILS. ADDITIONALLY, IMPLEMENTATION OF THIS ALTERNATIVE IS NOT ANTICIPATED TO RESULT IN ANY ADVERSE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

THE SELECTED REMEDIAL ACTION WILL COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE LOCATION-, ACTION-, AND CHEMICAL-SPECIFIC REQUIREMENTS (ARARS). A COMPLETE LISTING OF ARARS DEVELOPED DURING THE COMPARATIVE ANALYSIS OF ALTERNATIVES IS PRESENTED IN TABLE 4, THE ARARS SPECIFIC TO THE SELECTED REMEDY ARE PRESENTED BELOW.

- * CHEMICAL-SPECIFIC ARARS
 - NONE
- * LOCATION-SPECIFIC ARARS
 - NONE
- * ACTION-SPECIFIC ARARS
 - 40 CFR PART 264 - RCRA CLOSURE AND POST-CLOSURE REQUIREMENTS ARE APPLICABLE WHEN A HAZARDOUS WASTE LANDFILL IS BEING CAPPED.
 - 25 PA CODE 75.264 (O) AND (V) - PADER LANDFILL REGULATIONS ARE RELEVANT AND APPROPRIATE FOR THIS REMEDY.
 - 25 PA CODE 123.1 - PADER REGULATIONS REGARDING CONTROL OF DUST EMISSIONS ARE APPLICABLE TO THIS REMEDY.
 - 29 CFR PARTS 1910 AND 1926, OCCUPATIONAL HEALTH AND SAFETY ACT REQUIREMENTS ARE APPLICABLE TO ALL RESPONSE ACTIVITIES.

COST EFFECTIVENESS

THE SELECTED REMEDY IS COST EFFECTIVE BECAUSE IT HAS BEEN DETERMINED TO ELIMINATE THE PRIMARY EXPOSURE PATHWAY; IT IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT; AND HAS EXCELLENT SHORT-TERM EFFECTIVENESS PROPORTIONAL TO ITS COST. THE ESTIMATED CAPITAL COST FOR THIS ALTERNATIVE IS \$519,000, WITH A NET PRESENT WORTH COST INCLUDING 30 YEARS OF OPERATION AND MAINTENANCE OF \$1,037,000. THE SELECTED REMEDY PROVIDES A LEVEL OF PROTECTION OF HUMAN HEALTH COMPARABLE TO THAT PROVIDED BY THE OTHER REMEDIES, BUT AT A SIGNIFICANTLY REDUCED COST. ALTHOUGH OTHER REMEDIES MAY BE MORE EFFECTIVE IN THE LONG-TERM, THE SITE-RELATED RISKS DO NOT JUSTIFY THE ADDITIONAL CAPITAL EXPENDITURE.

UTILIZATION OF PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE

EPA HAS DETERMINED THAT THE SELECTED REMEDY REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A

COST EFFECTIVE MANNER FOR THE HRANICA LANDFILL SITE. OF THOSE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, THE EPA HAS DETERMINED THAT THE SELECTED REMEDY PROVIDES THE BEST BALANCE IN TERMS OF SHORT-TERM EFFECTIVENESS; IMPLEMENTABILITY; COST; REDUCTION IN TOXICITY, MOBILITY, AND VOLUME; AND LONG-TERM EFFECTIVENESS.

THE SELECTED REMEDY DOES NOT OFFER AS HIGH A DEGREE OF LONG-TERM EFFECTIVENESS AS THE OFFSITE DISPOSAL OR STABILIZATION ALTERNATIVES, HOWEVER, IT WILL SIGNIFICANTLY REDUCE THE RISKS TO HUMAN HEALTH POSED BY THE ASH PILE SOILS. THE EXCESS HUMAN CANCER RISK AT THE SITE HAS BEEN ESTIMATED TO BE $9.8E-6$, WHICH IS LOWER THAN EPA'S RECOMMENDED UPPER BOUND OF $1E-4$ TO $1E-7$. DUE TO THE RELATIVELY LOW RISK ASSOCIATED WITH THE SITE, EPA HAS DETERMINED THAT THE USE OF MORE COSTLY TREATMENT TECHNOLOGIES AT THE HRANICA LANDFILL SITE ARE NOT JUSTIFIABLE. BECAUSE ALL THE REMEDIAL ALTERNATIVES, WITH THE EXCEPTION OF ALTERNATIVES 1 AND 2, OFFER A COMPARABLE LEVEL OF PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, THE EPA HAS SELECTED ALTERNATIVE 3A, WHICH CAN BE IMPLEMENTED QUICKLY; WILL HAVE LITTLE OR NO ADVERSE EFFECTS ON THE SURROUNDING COMMUNITY; AND WILL COST CONSIDERABLY LESS THAN THE OTHER ALTERNATIVES.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

THE STATUTORY PREFERENCE FOR REMEDIAL ALTERNATIVES THAT EMPLOY TREATMENT AS THE PRINCIPAL ELEMENT HAS BEEN DETERMINED BY THE EPA TO BE IMPRACTICABLE AT THE HRANICA LANDFILL SITE. DUE TO THE RELATIVELY LOW RISK TO HUMAN HEALTH, THE UNPRODUCTIVE NATURE OF THE UPPER AQUIFERS, AND THE NATURE AND EXTENT OF CONTAMINATION, THE EPA HAS DETERMINED THAT ALTERNATIVE 3A, INCLUDING MONITORING, ACCESS RESTRICTIONS, INSTITUTIONAL CONTROLS, AND REPAIR OF THE ASH PILE CAP, CAN BE IMPLEMENTED MORE QUICKLY AND COST EFFECTIVELY THAN THE OTHER ALTERNATIVES WHILE STILL PROVIDING AN ADEQUATE LEVEL OF PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

DOCUMENTATION OF SIGNIFICANT CHANGES

THE PREFERRED ALTERNATIVE ORIGINALLY SELECTED IN THE PROPOSED PLAN IS ALSO THE PREFERRED ALTERNATIVE IDENTIFIED IN THE ROD. THERE HAVE BEEN NO SIGNIFICANT CHANGES MADE TO THE SELECTED REMEDY IN THE TIME PERIOD BETWEEN THE ISSUANCE OF THE PROPOSED PLAN ON MAY 18, 1990 AND THE SIGNING OF THE ROD APPROXIMATELY SIX WEEKS LATER.

#RS

RESPONSIVENESS SUMMARY

THIS COMMUNITY RELATIONS RESPONSIVENESS SUMMARY IS DIVIDED INTO THE FOLLOWING SECTIONS;

- SECTION A: OVERVIEW - A DISCUSSION OF THE EPA'S PREFERRED REMEDIAL ACTION ALTERNATIVE AND PUBLIC REACTION TO THIS ALTERNATIVE.
- SECTION B: BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS - A BRIEF HISTORY OF THE COMMUNITY'S INTEREST IN AND INVOLVEMENT WITH THE HRANICA LANDFILL SITE, INCLUDING A DISCUSSION OF CONCERNS RAISED BY COMMUNITY MEMBERS AND OFFICIALS DURING REMEDIAL PLANNING ACTIVITIES.
- SECTION C: SUMMARY OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES - A SUMMARY OF COMMENTS FOLLOWED BY EPA RESPONSES.
- SECTION D: REMAINING CONCERNS - A DESCRIPTION OF REMAINING COMMUNITY CONCERNS THAT SHOULD BE CONSIDERED AS THE EPA AND THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENT RESOURCES (PADER) CONDUCT THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE

HRANICA LANDFILL SITE.

IN ADDITION TO SECTIONS A THROUGH D, A LIST OF EPA COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE HRANICA LANDFILL SITE IS INCLUDED AS ATTACHMENT A OF THIS RESPONSIVENESS SUMMARY.

A. OVERVIEW

THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) REPORTS AND THE PROPOSED REMEDIAL ACTION PLAN WERE RELEASED TO THE PUBLIC FOR REVIEW AND COMMENT ON JUNE 18, 1990. THIS MARKED THE OPENING OF THE PUBLIC COMMENT PERIOD ON THE ALTERNATIVES DETAILED IN THE PROPOSED PLAN. EPA IDENTIFIED ITS PREFERRED REMEDIAL ALTERNATIVE IN THE PUBLIC NOTICE.

THE PREFERRED ALTERNATIVE WAS DESCRIBED IN DETAIL IN SECTION 3.3.3 OF THE FS REPORT AS ALTERNATIVE 3A. AS PROPOSED, ALTERNATIVE 3A INCLUDES THE CONSTRUCTION OF A FENCE LIMITING UNAUTHORIZED ACCESS TO THE SITE; DEED RESTRICTIONS ON THE PROPERTY TO PREVENT DEVELOPMENT OF ONSITE WATER AS A SOURCE OF DRINKING WATER AND PREVENT DRILLING INTO THE PLACEMENT COVER; ESTABLISHMENT OF A MONITORING PROGRAM FOR WELLS, SEEPS AND SURFACE WATER; AND THE PLACEMENT AND COMPACTION OF A TWO-FOOT CLAY COVER ON THE AREAS WHERE THE ASH PILE COVER HAS BEEN DISTURBED, OR WHERE SURFACE SOILS HAVE LEVELS OF LEAD GREATER THAN BACKGROUND (300 PARTS PER MILLION).

COMMENTS RECEIVED FROM THE PUBLIC SUGGEST THAT THE AREA RESIDENTS DO NOT OBJECT TO THE PREFERRED ALTERNATIVE. HOWEVER, THERE IS CONTINUED CONCERN THAT THE PREFERRED REMEDIAL ACTION DOES NOT ADDRESS THE POSSIBILITY OF CONTAMINATED GROUNDWATER MIGRATING OFFSITE. EPA HAS INCLUDED MONITORING OF RESIDENTIAL WELLS IN THE GROUNDWATER VERIFICATION STUDY TO ADDRESS THIS CONCERN.

B. BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

THE HRANICA LANDFILL SITE HISTORY DATES BACK TO 1957. BETWEEN 1957 AND 1960 THE HRANICA LANDFILL WAS USED AS A DISPOSAL AREA FOR INDUSTRIAL WASTES, AND BETWEEN 1960 AND 1973 INDUSTRIAL WASTE WAS BURNED AT THE SITE.

PUBLIC ATTENTION WAS FIRST FOCUSED ON THE SITE IN THE LATE 1960'S WHEN CONTAMINATION OF SPRINGS ON AN ADJACENT FARM WAS ATTRIBUTED TO THE DISPOSAL OF WASTE LIQUIDS AT THE HRANICA LANDFILL.

A PRELIMINARY ASSESSMENT OF THE SITE BY EPA WAS CONDUCTED IN APRIL, 1981 AND THE RESULTS OF THE HAZARD RANKING SYSTEM (HRS) RANKED THE HRANICA LANDFILL SITE FOR INCLUSION ON THE NATIONAL PRIORITIES LIST.

ON MAY 9, 1983, LOCAL RESIDENTS MET WITH REPRESENTATIVES OF PADER, PPG INDUSTRIES, INC., ALCOA, AND D'APPOLONIA TO DISCUSS REMOVAL ACTIONS PLANNED FOR THE SITE. IN ADDITION, AN EXECUTIVE MEETING WITH MUNICIPAL, COUNTY, STATE, AND FEDERAL OFFICIALS WAS CONDUCTED BY PADER TO DISCUSS THE REMOVAL ACTIONS.

AT A MEETING HELD ON DECEMBER 17, 1984 BETWEEN PADER AND THE BUFFALO TOWNSHIP BOARD OF SUPERVISORS, THE TOWNSHIP EXPRESSED THE NEED FOR AN INVESTIGATION OF HEALTH RELATED IMPACTS, AND A FORMAL REQUEST BY THE TOWNSHIP FOR A CANCER STUDY WAS MADE ON DECEMBER 27, 1984. IN JULY, 1985, AFTER ANALYZING CANCER MORTALITY DATA FROM THE PENNSYLVANIA VITAL STATISTICS SYSTEM FOR BUFFALO TOWNSHIP AND BULTER COUNTY, THE PENNSYLVANIA DEPARTMENT OF HEALTH CONCLUDED THAT NO SUBSTANTIAL EVIDENCE OF ABERRANT CANCER MORTALITY LEVELS OR PATTERNS WERE DETECTED IN THE DATA AND THE DATA DID NOT INDICATE A NEED FOR FURTHER STUDY OR ANALYSIS.

CONCERNS EXPRESSED BY THE COMMUNITY DURING TELEPHONE INTERVIEWS CONDUCTED TO PREPARE THE COMMUNITY RELATIONS PLAN IN 1988 INCLUDED THE FOLLOWING:

1. GROUNDWATER AND SUBSURFACE WATER CONTAMINATION WAS PRESENT AT

THE HRANICA LANDFILL SITE AND NEEDED TO BE ADDRESSED.

2. POTENTIAL CARCINOGENIC EFFECTS OF THE SITE MAY LEAD TO HEALTH PROBLEMS FOR LONG-TERM RESIDENTS OF THE AREA.
3. THE RESULTS OF SURFACE WATER SAMPLING HAVE BEEN CONFLICTING AND CITIZENS ARE PUZZLED.
4. LACK OF KNOWLEDGE OF THE SUPERFUND PROCESS AND THE LONG SCHEDULE FOR IMPLEMENTING THE NECESSARY INVESTIGATIONS AND SUBSEQUENT REMEDIAL ACTIONS TO CORRECT THE PROBLEM.

PUBLIC COMMENTS RECEIVED AT THE PUBLIC MEETING HELD ON JUNE 7, 1990, ON THE REMEDIAL ALTERNATIVES DETAILED IN THE FS FOCUSED ON GROUNDWATER CONTAMINATION, INDIVIDUAL CONTACT WITH CONTAMINATED SOIL ONSITE AND DEFINITION OF ORGANIC AND INORGANIC COMPOUNDS.

C. SUMMARY OF PUBLIC COMMENTS

1. ONE COMMENTOR QUESTIONED WHETHER THE PREFERRED ALTERNATIVE INCLUDES A DEED RESTRICTION AND, IF SO, WHAT THE DEED RESTRICTION ENCOMPASSES.

EPA RESPONSE: THE PREFERRED ALTERNATIVE INCLUDES A DEED RESTRICTION PROHIBITING ANY CONSTRUCTION ON THE SITE THAT WOULD DAMAGE THE LANDFILL CAP. THIS INCLUDES CONSTRUCTION OF ANY BUILDINGS OR WELLS.

2. ONE COMMENTOR ASKED THE SIGNIFICANCE OF DICHLOROETHYLENE, TRICHLOROETHYLENE, DICHLOROPROPANE AND BENZENE IN THE GROUNDWATER AND OFFSITE SURFACE WATER.

EPA RESPONSE: ALL OF THE CHEMICALS LISTED ARE ORGANIC CHEMICALS, MEANING THEY CONTAIN CARBON IN THEIR STRUCTURE. TRICHLOROETHYLENE AND BENZENE ARE CONSIDERED HAZARDOUS IF A PERSON IS EXPOSED TO THEM. IN ORDER FOR THESE CHEMICALS TO BE HAZARDOUS TO HUMAN HEALTH, HOWEVER, A PATHWAY MUST EXIST FOR HUMAN CONTACT/EXPOSURE.

THE GROUNDWATER CONTAINING THOSE CHEMICALS WAS FROM THE ONSITE MONITORING WELLS. LOCAL PEOPLE DO NOT DRINK THAT WATER, NOR ARE THEY EXPOSED TO IT. BASED ON GROUNDWATER MODELING STUDIES, THERE IS NO INDICATION THAT THOSE CHEMICALS WILL MIGRATE FROM THE SITE IN CONCENTRATIONS SIGNIFICANT ENOUGH TO ADVERSELY IMPACT RESIDENTS.

THE SURFACE WATER ASSOCIATED WITH THE SITE IS A FEW INTERMITTENT TRIBUTARIES, WITH WHICH HUMANS OR AQUATIC LIFE ARE UNLIKELY TO COME IN CONTACT.

3. A COMMENTOR ASKED IF THOSE CHEMICALS WERE FOUND IN RESIDENTIAL WELLS.

EPA RESPONSE: EPA DID SAMPLE RESIDENTIAL WELLS. LABORATORY PROBLEMS, HOWEVER, CAUSED EPA TO DISREGARD THE SAMPLES. ALTHOUGH TESTING INDICATED THAT NO CONTAMINATION EXISTS, EPA CHOSE TO PERFORM MODELING ASSESSMENTS. THOSE ASSESSMENTS WERE BASED ON THE CONCENTRATION OF CONTAMINANTS ON THE SITE, OR IN GROUNDWATER ON THE SITE. THE RESULTS DID NOT PREDICT SIGNIFICANT CONTAMINATION AT NEARBY HOMES. AT LEAST ONE MORE ROUND OF RESIDENTIAL SAMPLING WILL BE INCLUDED IN FUTURE GROUNDWATER TESTING TO VERIFY THE MODELING RESULTS.

4. ONE COMMENTOR QUESTIONED HOW LONG WATER TESTING WILL CONTINUE

EPA RESPONSE: OPERATION AND MAINTENANCE (O&M) FOR THE HRANICA SITE IS SCHEDULED FOR 30 YEARS. EPA'S WATER SAMPLING WILL

CONTINUE TO ENSURE THAT CONTAMINATION IN GROUNDWATER WELLS IS NOT INCREASING, AND TO MONITOR IMPROVEMENT.

5. ONE COMMENTOR ASKED IF THE EPA SAMPLED WATER AT THE OBRINGER SPRING ON A NEIGHBORING FARM.

EPA RESPONSE: THE OBRINGER SPRING WAS SAMPLED. AT ONE TIME THE SPRING ON THAT FARM WAS CONTAMINATED, BUT IT NO LONGER IS.

6. A COMMENTOR QUESTIONED HOW THE EPA COULD BE SURE THAT THE OBRINGER SPRING WOULD NOT BE CONTAMINATED AGAIN, YEARS FROM NOW.

EPA RESPONSE: EPA HAS REMOVED THE SOURCE OF THE CONTAMINATION, THE DRUMS OF HAZARDOUS WASTES.

7. ONE COMMENTOR INDICATED CONCERN FOR A DEEP CREVICE IN THE BEDROCK AT THE HRANICA SITE THAT MAY HAVE LED TO CONTAMINATION OF THE OBRINGER PROPERTY.

EPA RESPONSE: EPA WAS UNABLE TO LOCATE THE CREVICE. THE GROUNDWATER STUDIES PERFORMED INCLUDED A FRACTURE TRACE ANALYSIS TO IDENTIFY FRACTURES AND RESULTANT CONTAMINATION. THUS FAR, NO SIGNIFICANT OFFSITE CONTAMINATION HAS BEEN DETECTED, BUT FURTHER STUDIES WILL CONTINUE.

8. A COMMENTOR ASKED WHAT THE COST OF O&M WILL BE AND SUGGESTED THAT THE MONEY WOULD BE BETTER SPENT EXTENDING THE CITY'S WATER LINES TO SERVE THE HRANICA AREA RESIDENTS.

EPA RESPONSE: MANY PEOPLE LIVING AROUND THE SITE DO NOT USE GROUNDWATER AS THEIR WATER SUPPLY. THOSE PEOPLE ARE SUPPLIED WITH PUBLIC WATER. THE AREA BEYOND THE SITE THAT IS NOT ON PUBLIC WATER IS IN THE OPPOSITE DIRECTION OF THE GROUNDWATER FLOW. IT IS UNLIKELY THAT THIS WATER IS CONTAMINATED.

9. A COMMENTOR ASKED IN WHAT WAY THE EPA WILL PREVENT HUMAN EXPOSURE TO THE CONTAMINATED SOIL, AND WHAT AREA OF THE SITE WOULD BE CAPPED.

EPA RESPONSE: THE CAP CURRENTLY COVERING THE SITE IS TWO FEET THICK. PARTS OF THE CAP HAVE BEEN DISTURBED AND THOSE EXPOSED SOILS WHICH SHOW CONTAMINATION WILL BE RE-CAPPED. APPROXIMATELY 1-2 ACRES OF THE SITE IN TOTAL WILL BE RECAPPED. FURTHER SAMPLING WILL ENSURE THAT NO CONTAMINATED SOIL WILL BE LEFT UNCOVERED, AND THE SITE WILL BE FENCED OFF TO DISCOURAGE TRESPASSING.

10. A COMMENTOR ASKED WHAT REMEDIAL ACTIVITY HAD TAKEN PLACE ON WOODED AREAS OF THE PROPERTY.

EPA RESPONSE: ALL HAZARDOUS WASTE WAS REMOVED FROM THAT AREA OF THE SITE. A FEW CARS REMAIN THERE, AS WELL, AS A 5,000 GALLON TANK. THE TANK DOES NOT, HOWEVER, CONTAIN ANY HAZARDOUS WASTE.

D. REMAINING CONCERNS

THE ONE ISSUE OR CONCERN EXPRESSED DURING THE PUBLIC COMMENT PERIOD THAT EPA WAS NOT ABLE TO ADDRESS BY THE PREFERRED REMEDIAL ACTION IS THE CONCERN THAT CLEANUP OF GROUNDWATER CONTAMINATION WILL NOT BE INCLUDED IN THE REMEDY. CITIZENS ARE CONCERNED THAT CONTAMINATED GROUNDWATER WILL MIGRATE OFFSITE AND AREA RESIDENTS WILL BE EXPOSED TO CONTAMINATED GROUNDWATER.

EPA DOES PROPOSE WELL MONITORING TO DETECT MIGRATION OF CONTAMINANTS AND A WATER VERIFICATION STUDY TO CONFIRM RESULTS OF THE FEASIBILITY STUDY.

ATTACHMENT A
COMMUNITY RELATIONS ACTIVITIES CONDUCTED
AT THE HRANICA LANDFILL SITE

- * PUBLIC MEETING TO DISCUSS REMOVAL ACTIONS SCHEDULED TO TAKE PLACE AT THE SITE IN JULY WAS HELD IN MAY 1983.
- * COMMUNITY INTERVIEWS WERE HELD AND A COMMUNITY RELATIONS PLAN WAS FORMULATED IN NOVEMBER 1986.
- * A PRESS RELEASE ANNOUNCED A PUBLIC MEETING AND THE CONSENT ORDER TO CONDUCT THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) IN MARCH 1987.
- * AN INFORMATIONAL PUBLIC MEETING TO DISCUSS THE CONSENT ORDER TO CONDUCT THE RI/FS WAS HELD ON MARCH 13, 1987.
- * A PUBLIC NOTICE IN TWO LOCAL NEWSPAPERS ANNOUNCED THE AVAILABILITY OF THE RI/FS REPORTS AND THE PROPOSED REMEDIAL ACTION PLAN AT THE LOCAL INFORMATION REPOSITORY ON MAY 18, 1990. IT ALSO ANNOUNCED THE OPENING OF THE COMMENT PERIOD ON THE ALTERNATIVES DETAILED IN THE PROPOSED PLAN AND THE PUBLIC MEETING SCHEDULED FOR JUNE 7, 1990.
- * A FACT SHEET SUMMARIZING THE PROPOSED PLAN AND EPA'S PREFERRED ALTERNATIVE WAS MADE AVAILABLE TO THE PUBLIC IN JUNE 1990.
- * A PUBLIC MEETING TO RECEIVE COMMENTS ON THE ALTERNATIVES DETAILED IN THE PROPOSED PLAN WAS HELD ON JUNE 7, 1990.

TABLE 1
RISK ASSESSMENT INPUT DATA BY MEDIA

CONSTITUENT GROUNDWATER (MG/L)	CONCENTRATION
ACETONE	0.269
BENZENE	0.0155
2-BUTANONE (MEK)	0.0320
4-METHYL-2-PENTANONE (MIBK)	0.0825
NAPHTHALENE	0.0724
CADMIUM	0.0217
BERYLLIUM	0.0224
CHROMIUM	0.0998
LEAD	0.0658
NICKEL	0.245
SOIL (ASH PIT AREA; MG/KG)B	
ANTIMONY	15.24
ARSENIC	6.14
BARIUM	3,035
CADMIUM	328.6
CHROMIUM	268.5
LEAD	5,398
MANGANESE	520.7
MERCURY	2.50
NICKEL	29.57
SELENIUM	107.1
ZINC	2,839
CYANIDE	2.62
TOLUENE	0.0096
XYLENE	0.173
TETRACHLOROETHYLENE	0.0211
TRICHLOROETHYLENE	0.0044
1,1,1-TRICHLOROETHANE	0.0061
NAPHTHALENE	11.82
BIS(2-ETHYLHEXYL) PHTHALATE	3.247
PCB (1245/1260)	10.96

SOIL (NON-ASH PIT AREA, MG/KG)C

ANTIMONY	6.78
ARSENIC	6.94
BARIUM	185.2
CADMIUM	19.12
CHROMIUM	59.60
LEAD	629.7
MANGANESE	759.0
MERCURY	1.68
NICKEL	23.63
SELENIUM	1.70
ZINC	591.0
CYANIDE	1.26
TOLUENE	0.0087
XYLENE	0.021
TETRACHLOROETHYLENE	0.0025
TRICHLOROETHYLENE	0.0035
1,1,1-TRICHLOROETHANE	0.0050
NAPHTHALENE	0.134
BIS(2-ETHYLHEXYL)PHTHALATE	0.59
PCB (1254/1260)	1.57

SOIL GAS (UG/L)D

BENZENE	1.81
TOLUENE	115.5
XYLENE (TOTAL)	3,637

A GROUNDWATER WELLS 1D, 2D, 3D, AND 4D (DUPLICATES INCLUDED).

B SOIL BORINGS B5, B9, B11, AND B17 (MOST SURFICIAL SAMPLE ONLY 0 TO 3.0 FEET; DUPLICATES INCLUDED)

C SOIL BORINGS B2 TO B4, B6, B10, B13 TO B16, B18 (MOST SURFICIAL SAMPLE ONLY - 0 TO 3.0 FEET).

D SOIL-GAS PROBE SAMPLES 1 TO 140 (DUPLICATES INCLUDED).

NOTE; ALL CONCENTRATIONS REPRESENT 95 PERCENT ARITHMETIC UPPER BOUND LIMIT (DATA PRESENTED IN DUNN GEOSCIENCE, 1989).

TABLE 2
CANCER POTENCY FACTORS AND REFERENCE DOSES
USED IN HRANICA SITE RISK CHARACTERIZATION

CONSTITUENTS VOLATILES (VOC)	CPF (MG/KG/DAY)-1A		REFERENCE C
	ORAL	INHALATION	
ACETONE			1
TETRACHLOROETHYLENE	0.051	0.0033	1
BENZENE	0.029	0.0292	1
TOLUENE			1
XYLENE			1
4-METHYL-2PENTANONE			1
2-BUTANONE			1
TRICHLOROETHYLENE	0.011	0.0172	1
1,1,1-TRICHLOROETHANE			1

CONSTITUENTS VOLATILES (VOC)	RFD (MG/KG/DAY)-B		REFERENCE C
	ORAL	INHALATION	
ACETONE	0.1		1
TETRACHLOROETHYLENE	0.01		1
BENZENE			1
TOLUENE	0.3	2.0	1
XYLENE	2.0	0.3	1
4-METHYL-2PENTANONE	0.05	0.02	1
2-BUTANONE	0.05	0.09	1
TRICHLOROETHYLENE			1
1,1,1-TRICHLOROETHANE	0.09	0.3	1

SEMIVOLATILES (SVOC)

NAPHTHALENE			1
BIA(2-ETHYLHEXYL)			
PHTHALATE	0.014		1
NAPHTHALENE	0.4		1
BIA(2-ETHYLHEXYL)			
PHTHALATE	0.02		1
PCBS			
PCB-1254/1260	7.7		1

METALS

ANTIMONY			1
ARSENIC	0.175D	50	1
BARIUM			1
BERYLLIUM		8.4	1
CADMIUM		6.1	1
CADMIUM			1
CHROMIUM		41	1
ANTIMONY	0.0004		1
ARSENIC	0.001		1
BARIUM	0.05	0.0001	1
BERYLLIUM	0.005		1
CADMIUM	0.001E		1
CADMIUM	0.0005F		1
CHROMIUM	0.005		1
LEAD			2
MANGANESE			1
MERCURY			1
NICKEL		0.84	1
SELENIUM			1
ZINC			1
CYANIDE			1

LEAD	0.0014G		2
MANGANESE	0.2	0.0003	1
MERCURY	0.0003		1
NICKEL	0.02		1
SELENIUM	0.003	0.001	1
ZINC	0.2		1
CYANIDE	0.02		1

- A. CPF = CANCER POTENCY FACTOR FOR CARCINOGENIC EFFECTS.
- B. RFD = REFERENCE DOSE FOR NONCARCINOGENIC EFFECTS.
- C. REFERENCE 1 = HEALTH EFFECTS ASSESSMENT SUMMARY, US EPA, 1989, 3RD QUARTER.

REFERENCE 2 = DERIVED FROM LIFETIME HEALTH ADVISORY OF 20 UG/DAY
USING BODY WEIGHT = 14 KG (US EPA DRINKING WATER HEALTH ADVISORY, 1985).
- D. DERIVED FROM UNIT RISK OF 5×10^{-5} UG/1 USING BODY WEIGHT OF 70 KG,
INGESTION RATE OF 2 l/DAY, AND BENCHMARK CANCER RISK OF 1×10^{-5} .
A BENCHMARK CANCER RISK ONE ORDER OF MAGNITUDE LESS CONSERVATIVE
THAN 1×10^{-6} IS APPROPRIATE FOR ORAL EXPOSURE FROM ARSENIC DUE TO
THE UNCERTAINTIES ASSOCIATED WITH INGESTED INORGANIC ARSENIC
(IRIS, 1990; SECTION II.B).
- E. REPRESENTS ORAL RFD FOR FOOD FOR SOIL INGESTION EXPOSURE PATHWAY.
- F. REPRESENTS ORAL RFD FOR WATER FOR WATER INGESTION EXPOSURE PATHWAY.
- G. THE RFD FOR LEAD HAS BEEN SUSPENDED BECAUSE IT IS CURRENTLY BELIEVED
BY THE US EPA THAT FOR YOUNG CHILDREN, NO EXPOSURE TO LEAD IS
ACCEPTABLE. ALTHOUGH CANCER POTENCY FACTORS ARE UNAVAILABLE AS
YET, LEAD IS CONSIDERED TO BE A PROBABLE HUMAN CARCINOGEN VIA THE
ORAL AND INHALATION ROUTES.

TABLE 3
SUMMARY OF RISK ESTIMATES FOR EXPOSURE TO ALL MEDIA
WITH EXPOSURE TO ASH PIT AREA CONSTITUENTS

POPULATION	TOTAL LIFETIME CANCER RISK	TOTAL NONCARCINOGENIC HAZARD INDEX
ADULT TRESPASSER	9.8 X 10 ⁻⁶	1.2
CHILD TRESPASSER	7.3 X 10 ⁻⁶	4.4
OFF-SITE ADULT	1.2 X 10 ⁻⁶	0.51
OFF-SITE CHILD	1.2 X 10 ⁻⁶	0.85

WITH EXPOSURE TO NON-ASH PIT AREA CONSTITUENTS

POPULATION	TOTAL LIFETIME CANCER RISK	TOTAL NONCARCINOGENIC HAZARD INDEX
ADULT TRESPASSER	1.5 X 10 ⁻⁵	0.13
CHILD TRESPASSER	1.1 X 10 ⁻⁶	0.48
OFF-SITE ADULT	1.1 X 10 ⁻⁶	0.42
OFF-SITE CHILD	1.0 X 10 ⁻⁶	0.60